इंटरनेट मानक

## Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”
Mazdoor Kisan Shakti Sangathan
“The Right to Information, The Right to Live”

“पुराने को छोड नये के तरफ”
Jawaharlal Nehru
“Step Out From the Old to the New”

IS 2570 (1980): Specificaion for Methyl Parathion, Technical [FAD 1: Pesticides and Pesticides Residue Analysis]

“ज्ञान से एक नये भारत का निर्माण”
Satyanarayan Gangaram Pitroda
“Invent a New India Using Knowledge”

Act Number 22 of 2005
The Indian Parliament
RIGHT TO INFORMATION

Made Available By
Public.Resource.Org

“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”
Bhartṛhari—Nītiśatakam
“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE

BRUTUM FULMEN

IGNORANTIA JURIS NON EXCUSAT

PROTECTED BY COPYRIGHT

IS : 2570 - 1980
( Reaffirmed 2012 )

# *Indian Standard*
# SPECIFICATION FOR METHYL PARATHION, TECHNICAL
## *(First Revision)*

---

Second Reprint FEBRUARY 1999

UDC 632.951 METHYL PARATHION

© *Copyright* 1980

BUREAU OF INDIAN STANDARDS
**MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG**
**NEW DELHI 110002**

**Gr 3**

*October* 1980

# Indian Standard

# SPECIFICATION FOR METHYL PARATHION, TECHNICAL

## ( First Revision )

---

### Pest Control Sectional Committee, AFCDC 6

| *Chairman* | *Representing* |
|---|---|
| DR K. D. **PAHARIA** | Directorate of Plant Protection. Quarantine & Storage ( Ministry of Agriculture & Irrigation ), Faridabad |
| *Members* | |
| DR **N.** S. **AGARWAL** | Ministry of Agriculture & Irrigation ( Department of Food ) |
| DR K. **KRISHNAMURTHY** ( *Alternate* ) | |
| **DR** H. L. **BAMI** | Central Forensic Science Laboratory ( Central Bureau of Investigation ), New Delhi |
| **DR** B. **BANFR JEE** | Tea Research Association, Calcutta |
| DR G. SATYANARAYANA ( *Alternate* ) | |
| DR S. R. BAROOAH | Pesticides Formulators Association of India ( S. S. I. ), Bombay |
| DR N. K. **BASU** | The Alkali & Chemical Corporation of India Limited, Calcutta |
| **SHRI** S. R. NENE ( *Alternate* ) | |
| DR A. K. BHATNAOAR | Hindustan Insecticides Limited, New Delhi |
| **SHRI** C. C. **ABRAHAM** ( *Alternate* ) | |
| DR S. S. **CHADHA** | Pesticides Association of India, New Delhi |
| **SHRI S. K. RAMAN** ( *Alternate* ) | |
| **CHIEF PLANT** PROTECTION OFFICER | Department of Agriculture ( Government of Maharashtra ), Bombay |
| **CHEMIST INCHARGE, INSECTICIDES TESTING** LABORATORY ( *Alternate* ) | |
| **SHRI** V. G. DESHPANDE | Ciba-Geigy of India Limited, Bombay |
| **SHRI** E. A. **ALMEIDA** ( *Alternate* ) | |
| **SHRI** O. P. **DHAMIJA** | Export Inspection Council of India, New Delhi |
| SHRI P. P. **RANGA** RAO ( *Alternate* ) | |
| **DR** M. S. DHATT | National Malaria Eradication Programme, Delhi |

( *Continued on page* 2 )

© *Copyright 1980*
BUREAU OF INDIAN STANDARDS
This publication is protected under the *Indian Copyright Act ( XIV* of 1957 ) and reproduction in whole or in part by any means except with written permission of the publisher shall be deemed to be an infringement of copyright under the said Act.

( *Continued from page* 1 )

| *Members* | *Representing* |
|---|---|
| Director of Agriculture | Department of Agriculture, Government of Uttar Pradesh, Lucknow |
| Deputy Director ( Plant Protection ) ( *Alternate* ) | |
| Drugs Controller ( India ) | Indian Pharmacopoeia Committee ( Ministry of Health & Family Welfare ), New Delhi |
| Shri M. Ravikant ( *Alternate* ) | |
| Shri G. D. Gokhale | Bombay Chemicals Private Limited, Bombay |
| Shri V. V. Ketkar ( *Alternate* ) | |
| Joint Director of Agriculture ( Development & ICP ) | Department of Agriculture ( Government of Karnataka ), Mysore |
| Deputy Director of Agriculture ( Plant Protection ) ( *Alternate* ) | |
| Dr R. L. Kalra | Punjab Agricultural University, Ludhiana |
| Dr R. P. Chawla ( *Alternate* ) | |
| Dr Krishan Singh | Indian Institute of Sugarcane Research ( ICAR ), Lucknow |
| Dr S. C. Srivastava ( *Alternate* ) | |
| Shri S. G. Krishnan | National Organic Chemical Industria Limited, Bombay |
| Dr J. S. Verma ( *Alternate* ) | |
| Shri S. K. Luthra | Directorate General of Technical Development, New Delhi |
| Shri S. C. Bajaj ( *Alternate* ) | |
| Shri S. K. Majumdar | Central Food Technological Research Institute ( CSIR ), Mysore |
| Shri M. Muthu ( *Alternate* ) | |
| Shri K. S. Mehta | Bharat Pulverising Mills Private Limited, Bombay |
| Shri S. Chatterji ( *Alternate* ) | |
| Dr A. L. Mookerjee | Cyanamid India Limited, Bombay |
| Shri J. P. Parikh ( *Alternate* ) | |
| Dr S. K. Mukerjee | Agricultural Chemicals Division, Indian Agricultural Research Institute ( ICAR ), New Delhi |
| Dr N. K. Roy ( *Alternate* ) | |
| Shri K. R. Narayana Rao | Food Corporation of India, New Delhi |
| Smt K. K. M. Bhavnani ( *Alternate* ) | |
| Shri I. Narsareddy | Department of Agriculture, Government of Andhra Pradesh, Hyderabad |
| Shri C. Dharma Rao ( *Alternate* ) | |
| Dr V. N. Nigam | Ministry of Defence ( DGI ) |
| Shri P. N. Agrawal ( *Alternate* ) | |
| Dr S. Y. Pandit | Bayer ( India ) Limited, Bombay |
| Shri D.N. Nakhate ( *Alternate* ) | |
| Dr T. N. Parthasarathy | Regional Research Laboratory ( CSIR ), Hyderabad |
| Dr J. Madhusudhan Rao ( *Alternate* ) | |
| Shri M. A. Patel | Department of Agriculture, Government of Gujarat, Ahmadabad |
| Shri C. F. Paul | Ministry of Defence ( R & D ) |
| Shri M. G. Chatterjee ( *Alternate* ) | |
| Shri Y. A. Pradhan | Rallis India Limited, Bombay |
| Dr Z. J. Kapadia ( *Alternate* ) | |

( *Continued on page* 9 )

# *Indian Standard*

# SPECIFICATION FOR METHYL PARATHION, TECHNICAL

## *( First Revision )*

## 0. FOREWORD

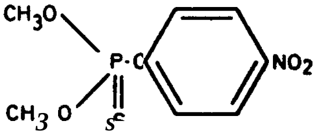
**0.1** This Indian Standard ( First Revision ) was adopted by the Indian Standards Institution on 25 August 1980, after the draft finalized by the Pest Control Sectional Committee had been approved by the Agricultural and Food Products Division Council and the Chemical Division Council.

**0.2** Methyl parathion, technical is used in the preparation of formulations required for the control of agricultural insect pests.

**0.3** This standard was first published in 1963. In this revision limits for moisture content and acidity have been revised. Opportunity has been taken to give the requirements of relative density at 27°/27°C besides aligning other requirements as stipulated by Central Insecticides Board ( CIB ).

**0.4** Methyl parathion is the accepted common name by the International Organization for Standardization for 0 0-dimethyl 0-( pnitrophenyl ) phosphorothioate ( also known as dimethyl 4-nitrophenyl phosphorothionate ). The empirical and structural formulae and the molecular mass of the methyl parathion are as indicated below:

| Empirical *Formula* | *Structural Formula* | ***Molecular Mass*** |
|---|---|---|
| $C_8H_{10}O_5NPS$ | | 263·21 |



*0.5* In the preparation of this standard due consideration has been given to the provisions of the Insecticides Act, 1968 and the Rules framed thereunder. However, this standard is subject to the restrictions imposed under these, wherever applicable.

0.6 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

## 1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and tests for methyl parathion, technical.

## 2. REQUIREMENTS

2.1 Description — The material shall be in the form of a clear liquid and having a tendency to crystallize at lower temperatures. It should be free from extraneous matter and added modifying agents.

22 The material shall also comply with the requirements specified in Table 1.

TABLE 1 REQUIREMENTS FOR METHYL PARATHION, TECHNICAL

| SL No. | CHARACTERISTIC | REQUIREMENT | METHOD OF TEST, REF TO | |
|---|---|---|---|---|
| | | | Appendix of this Standard | Cl No. of IS : 6940-1973* |
| (1) | (2) | (3) | (4) | (5) |
| i) | 00-dimethyl 0-( *p*-nitrophenyl ) phosphorothioate ( methyl parathion ) content, percent by mass, Min | 92·0 | A | — |
| ii) | Moisture content, percent by mass, Max | 0·3 | | 4 |
| rii) | Material insoluble in acetone, percent by mass, Max | 0·1 | — | 9 |
| iv) | Acidity ( as $H_2SO_4$ ), percent by mass, Max | 0·3 | — | 11.3 |
| v) | Relative density at 27°/27°C, *Min* | 1·340 | — | 5 |

*Methods of tests for pesticides and their formulationa.

---

*Rules for rounding off numerical values ( *revised* ).

## 3. PACKING AND MARKING

**3.1 Packing** — The material shall be packed according to the requirements given in IS : 8190 ( Part II )-1980*.

**3.2 Marking** — The containers shall bear legibly and indelibly the following information in addition to any other information as required under the Insecticides Act and Rules:

a) Name of the material;
b) Name of the manufacturer;
c) Date of manufacture;
d) Batch number;
'e) Methyl parathion content, percent ( *m/m* );
f) Net volume of contents; and
g) The minimum cautionary notice as worded in the Insecticides Act and Rules.

3.2.1 In addition to the above, the containers shall also be marked with the symbol for ' Danger of Poisoning ' as specified in IS : 1260 ( Part I )-1973†.

32.2 The containers may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution ( Certification Marks ) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditionr, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

## 4. SAMPLING

4.1 Representative samples of the material shall be drawn as prescribed in ' Indian Standard methods for sampling of pesticides and their formulations ' ( *under preparation* ).

NOTE -Till such time the standard under preparation is published the samples shall be drawn as agreed to between the concerned parties.

## 5. TESTS

5.1 Tests shall be carried out by the methods referred to in col 4 and 5 of Table 1.

---

*Requirements for packing of pesticides: Part II Liquid pesticides ( *first revision* ).

†Pictorial marking of handling and labelling of goods: Part I Dangerous goods ( *first revision* ).

**5.2 Quality of Reagents** — Unless specified otherwise, pure chemicals and distilled water ( *see* IS : 1070-1977* ) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

# APPENDIX *A*

[ *Table* 1, *Item* (i) ]

## DETERMINATION OF OO-DIMETHYL O-( *p*-NITROPHENYL ) PHOSPHOROTHIOATE ( METHYL PARATHION ) CONTENT

### A-1. METHOD

**A-1.1** Methyl parathion is separated from pnitrophenol, the most likely impurity, by mild alkaline extraction of an ether solution. The methyl parathion in the ether layer is reduced by zinc and an acetic acid-hydrochloric acid mixture, and the amino groups formed are titrated with the standard sodium nitrite solution.

### A-2. REAGENTS

**A-2.1 Sodium Carbonate Solution** — one percent ( m/v ).

**A-2.2 Concentrated Hydrochloric Acid**

**A-2.3 Acetic Acid** — glacial.

**A-2.4 Acetic Acid-Hydrochloric Acid Mixture** — ( 9 : 1 *v/v* ).

**A-2.5 Zinc Dust** — iron-free.

**A-2.6 Sodium or Potassium Bromide**

**A-2.7 Sulphanilic Acid** — anhydrous.

**A-2.8 Standard Sodium Nitrite Solution**-0·1 M, prepared by dissolving 6·90 g of sodium nitrite in water and making up to one litre with water. This solution is standardized as follows.

**A-2.8.1** Weigh accurately 0·40 to 0·45 g of anhydrous sulphanilic acid into a 400 ml tall-form beaker. Add 80 ml of water, 10 ml of concentrated hydrochloric acid, 30 ml of glacial acetic acid and 5 g of sodium or potassium bromide. Cool the mixture to 0 to 10° C by the addition of clean, shaved ice and place under a mechanical stirrer. Titrate this mixture at 0 to 10°C with 0·1 M sodium nitrite solution as rapidly as the spot test ( *see* A-3.3 ) permits. Near the end-point, add the sodium nitrite solution in 4-drop portions.

---

*Specification for water for general laboratory use ( *second revision* ).

Calculate the normality of the 0·1 M sodium nitrite solution as:

Normality of the 0·1 M sodium nitrite solution $= \frac{M \times 1000}{V \times 173'2} = \frac{M \times 5774}{V}$

where

$M$ = mass in g of the sulphanilic acid used, and
$V$ = volume in ml of 0·1 M sodium nitrite solution required.

## A-3. PROCEDURE

**A-3.1** Separation of Methyl Parathion from *p*-Nitrophenol — Weigh accurately from a weighing pipette 0·6 to 0·9 g of the material into 100 ml of ether contained in a 250-ml separating funnel. Extract the ether solution four times ( or until the -extract is colourless ) with 20-ml portions of chilled sodium carbonate solution, discarding the aqueous layers.

**A-3.2** Determination of Methyl Parathion in Ether Layer — Transfer the ether layer quantitatively to a 400-ml beaker, using small portions of ether. Add 35 ml of the acetic acid-hydrochloric acid mixture and three grams of zinc dust. Cover the beaker with a watch-glass and heat gently on a steam-bath until most of the ether has evaporated and the solution is colourless. Add 25 ml of concentrated hydrochloric acid to complete the solution of the zinc dust. Cool, wash down the beaker and watch-glass with 100 ml of water, and add 5 g of sodium or potassium bromide. Cool the mixture to 0 to 10°C by the addition of clean, shaved ice ( about 100 g ) and place under mechanical stirring. Titrate the mixture at 0 to 10°C with the standard 0·1 M sodium nitrite solution as rapidly as the spot test ( *see* A-3.3 ) permits; about 20 to 30 ml will be required. Near the end-point, add the sodium nitrite solution in 4-drop portions.

**A-3.3** Spot Test — Dip a glass rod into the solution to be tested and then touch the red quickly to a piece of starch potassium iodide paper. The end-point is reached when an intense blue black colour appears immediately and may he obtained repeatedly during a one-minute period without further addition of the sodium nitrite solution.

## A-4. CALCULATION

**A-4.1** 00-Dimethyl 0-( *p*-nitrophenyl ) phosphorothioate methyl parathion content, percent by mass $= \frac{VN \times 26{\cdot}32 \times f}{M}$

where

$V$ = volume, in ml, of the 0·1 M standard sodium nitrite solution required ( *see* A - 3.2 )

$N$ = normality of the 0·1 M sodium nitrate solution ( *see* A-2.8.1 );

$f$ = correction factor ( see **A-4.1.1** ); and

$M$ = mass, in g, of the material taken for the test ( *see* A-3.1 ).

**A-4.1.1** *Correction Factor* — Determine the value of the correction factor $f$ ( *see* Note 1 ) from the formula:

$$f = \frac{T}{A}$$

where

$T$ = theoretical, calculated quantity of the 0·1 M sodium nitrite solution to be used in the nitro group determination of one gram of a pure and solid substance containing one nitro group ( set Note 2 ); and

A = actual quantity of 0·1 M sodium nitrite solution used in the nitro group determination of one gram of pure, recrystallized sample of the same substance, following the method described above and using the same reagents.

NOTE 1 — The correction factor $f$ includes the errors arising from the impuritier of the reagents, the method itself and the handling of the method in a given laboratory. Its value shall lie within the range of 0'98 to 1·02.

NOTE 2 — Since methyl parathion is usually not available as a pure material, $f$ is evaluated on the basis of another substance containing one nitro group. The suitable chemicals are:

| Chemical | Melting Range |
|---|---|
| ● -nitrobennoic acid | 146-148°C |
| *m*-nitrobenzoic acid | 140-142°C |
| *p*-nitrobenzoic acid | 240-242·5°C |
| 3-nitrosalicylic acid, monohydrate | 124126% |
| 3-nitrosalicylic acid, anhydrous | 144-146°C |
| 5-nitrosalicylic acid | 228.230% |
| *p*-chloronitrobenzene | 83- 84°C |
| *p*-bromonitrobenzene | 126.127% |

( *Continued from page* 2 )

| *Members* | *Representing* |
|---|---|
| Dr Rattan Lal | Entomology Division, Indian Agricultural Research Institute ( ICAR ), New Delhi |
| Secretary | Central Insecticides Board, Directorate of Plant Protection, Quarantine & Storage ( Ministry of Agriculture & Irrigation ), Faridabad |
| AVM J. K. Sehgal | Directorate General Armed Forces Medical Services, ( DGAFMS), Ministry of Defence |
| Col K. K. Ghuliani ( *Alternate* ) | |
| Dr K. S. Singh | Indian Veterinary Research Institute ( ICAR ), Izatnagar |
| Shri S. C. Srivastava ( *Alternate* ) | |
| Shri N. S. Venkataraman | Department of Agriculture, Government of Tamil Nadu, Madras |
| Dr P. R. Venkateswaran | Union Carbide (India ) Limited, New Delhi |
| Dr K. N. Shrivastava ( *Alternate* ) | |
| Shri N. G. Wagle | Pest Control ( India ) Private Limited, Bombay |
| Shri M. R. Bajikar ( *Alternate* ) | |
| Dr B. L. Wattal | National Institute of Communicable Diseases, Delhi |
| Shri V. N. Bhatnagar ( *Alternate* ) | |
| Shri T. Purnanandam,<br>Director ( Agri & Food ) | Director General, ISI ( *Ex-officio Member* ) |

*Secretary*

Shri Lajinder Singh
Assistant Director ( Agri & Food ), ISI

## Pesticides Subcommittee, AFCDC 6 : 1

| *Convener* | |
|---|---|
| Dr K. D. Paharia | Directorate of Plant Protection, Quarantine & Storage ( Ministry of Agriculture & Irrigation ), Faridabad |
| *Members* | |
| Dr N. S. Agarwal | Ministry of Agriculture & Irrigation ( Department of Food) |
| Dr K. Krishnamurthy ( *Alternate* ) | |
| Shri E. A. Almeida | Ciba-Geigy of India Limited, Bombay |
| Shri F. Quadros ( *Alternate* ) | |
| Dr H. L. Bami | Central Forensic Science Laboratory ( Central Bureau of Investigation), New Delhi |
| Dr N. K. Basu | The Alkali & Chemical Corporation of India Limited, Calcutta |
| Shri S. R. Nene ( *Alternate* ) | |
| Dr A. K. Bhatnagar | Hindustan Insecticides Limited, New Delhi |
| Shri C. C. Abraham ( *Alternate* ) | |
| Shri S. S. Bhatnagar | Hindustan Petroleum Corporation Limited, Bombay |
| Shri S. P. Sharma ( *Alternate* ) | |
| Dr B. P. Chandrasekhar | BASF India Limited, New Delhi |
| Dr J. C. Majumdar ( *Alternate* ) | |

( Continued on page 10 )

( *Continued from page* 9 )

| *Members* | *Representing* |
|---|---|
| Dr M. S. Dhatt | National Malaria Eradication Programme, Delhi |
| Shri C. Dharma Rao | Pesticides Testing Laboratory, Hydcrabad |
| Shri V. Dorairaj | Plastic Containers Sectional Committee, MCPD 11, ISI |
| Shri C. D. Gokhale | Bombay Chemicalr Private Limited, Bombay |
| Shri V. V. Ketkar ( *Alternate* ) | |
| Shri D. R. Gupta | Central Revenues Control Laboratory ( Ministry of Finance ), New Delhi |
| Shri S. Krishnamurthy ( *Alternate* ) | |
| Dr Kalyan Singh | Chander Sekhar Azad University of Agriculture & Technology, Kanpur |
| Shri K. S. Mehta | Bharat Pulvcrising Mills Private Limited, Bombay |
| Shri S. Chatterji ( *Alternate* ) | |
| Shri L. S. Mirle | Agromore Limiter!, Bangalore |
| Dr S. K. Mukerjee | Agricultural Chemicals Division, Indian Agricultural Research Institute ( ICAR ), New Delhi |
| Dr N. K. Roy ( *Alternate* ) | |
| Dr S. Y. Pandit | Bayer ( India ) Limited, Bombay |
| Shri D. N. Nakhate ( *Alternate* ) | |
| Dr T. N. Parthasarathy | Regional Research Laboratory ( CSIR ), Hyderabad |
| Dr P. S. Phadke | Sandoz ( India ) Limited, Tbaue |
| Shri A. V. Natu ( *Alternate* ) | |
| Plant Protection Adviser to the Government of India | Directorate of Plant Protection, Quarantine & Storage ( Ministry of Agriculture & Irrigation ), Faridabad |
| Dr V. Lakshminarayana ( *Alternate* ) | |
| Shri S. M. Pradhan | Metal Containers Sectional Committee, MCPD 12, ISI |
| Shri Y. A. Pradhan | Rallir India Limited, Bombay |
| Shri M. L. Shah ( *Alternate* ) | |
| Shri D. N. V. Rao | Tata Chemicala Limited, Mithapur |
| Shri C. Neelkanthan ( *Alternate* ) | |
| Dr K. K. Saxena | Indofil Chemicals Limited, Bombay |
| Shri G. Natarajan ( *Alternate* ) | |
| Shri A. C. Shroff | Excel Industries Limited, Bombay |
| Shri P. V. Kango ( *Alternate* ) | |
| Shri N. S. Venkataraman | Paticida Testing Laboratory, Kovilpatti |
| Shri E. R. Viccajee | Paper and Flexible Packaging Sectional Committee, MCPD 14, IS1 |
| Dr B. L. Wattal | National Institute of Communicable Diseases, Delhi |
| Shri V. N. Bhatnagar ( *Alternate* ) | |

# BUREAU OF INDIAN STANDARDS

### *Headquarters*

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002
Telephones: 323 0131, 323 3375, 323 9402
Fax : 91 11 3234062, 91113239399, 91113239382

Telegrams : Manaksanstha
(Common to all Offices)

| *Central Laboratory:* | Telephone |
|---|---|
| Plot No. 20/9, Site IV, Sahibabad Industrial Area, SAHIBABAD 201010 | 8-77 00 32 |

### *Regional Offices:*

| | |
|---|---|
| Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110902 | 323 76 17 |
| *Eastern : 1/14 CIT Scheme VII M. V.I.P. Road, Maniktola, CALCUTTA700054 | 337 86 62 |
| Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160022 | 60 38 43 |
| Southern : C.I.T. Campus, IV Cross Road, CHENNAI 600113 | 235 23 15 |
| †Western : Manakalaya. ES Behind Marol Telephone Exchange, Andheri (East), MUMBAI 400093 | 832 92 95 |

### *Branch Offices:*

| | |
|---|---|
| ‘Pushpak’, Nurmohamed Shaikh Marg. Khanpur, AHMEDABAD 380001 | **550 13 48** |
| ‡Peenya Industrial Area, 1st Stage, Bangalore-Tumkur Road, BANGALORE 560058 | **839 49 55** |
| Gangotri Complex, 5th Floor, Bhadbhada Road, T. T. Nagar, BHOPAL 462003 | **55 40 21** |
| Plot No. 62-63. Unit VI. Ganga Nagar, BHUBANESHWAR 751001 | **40 36 27** |
| Kalaikathir Buildings, 670 Avinashi Road, COIMBATORE 641037 | **21 01 41** |
| Plot No. 43, Sector 16 A, Mathura Road, FARIDABAD 121001 | **8-28 88 01** |
| Savitri Complex, 116 G. T. Road, GHAZIABAD 201001 | **8-71 19 96** |
| 53/5 Ward No. 29, R. G. Barua Road, 5th By-lane, GUWAHATI 781003 | **54 11 37** |
| 5-8-58C, L. N. Gupta Marg, Nampally Station Road, HYDERABAD 500001 | **20 10 83** |
| E-52, Chitaranjan Marg, C-Scheme, JAIPUR 302001 | **37 29 25** |
| 1171418 B, Sarvodaya Nagar, KANPUR 208005 | **21 6876** |
| Seth Bhawan, 2nd Floor, Behind Leela Cinema, Naval Kishore Road, LUCKNOW 226001 | **23 89 23** |
| Patliputra Industrial Estate, PATNA 800013 | **26 23 05** |
| T. C. No. 14/1421, University P. 0. Palayam, THIRUVANANTHAPURAM 695034 | **6 21 17** |
| NIT Building, Second Floor, Gokulpat Market, NAGPUR 440010 | **52 51 71** |
| Institution of Engineers ( India ) Building, 1332 Shivaji Nagar, PUNE 411005 | **32 36 35** |

---

| | |
|---|---|
| ‘Sales Office is at 5 Chowringhee Approach, P. 0. Princep Street, CALCUTTA 700072 | **27 10 85** |
| †Sales Office is at Novelty Chambers, Grant Road, MUMBAI 400007 | **309 65 28** |
| *Sales Office is at ‘F’ Block, Unity Building, Narashimaraja Square, BANGALORE 560002 | **222 39 71** |

Printed at New India Printing Press, Khurja. India

## AMENDMENT NO. 1 MAY 1988

## TO

# IS : 2570 - 1980 SPECIFICATION FOR METHYL PARATHION, TECHNICAL

## *( First Revision )*

( *Page* 4, *Table* 1 ) — Substitute 'IS : 6940-1982*' *for* 'IS : 6940-1973*', wherever occurs.

( *Page* 4, *Table* 1, *foot-note with* '*' *mark* ) — Substitute the following for the existing foot-note:

'*Methods of tests for pesticides and their formulations ( *first revision* ).'

( *Page* 5, *clause* **4.1**, *with note* ) — Substitute the following for the existing matter:

'**4.1** Representative samples of the material shall be drawn as prescribed in IS : 10946-1984 'Methods of sampling for technical grade pesticides'.

( *Pages* 6, 7 *and* 8, *Appendix* A ) — Substitute the following for the existing appendix:

## 'APPENDIX A

[ *Table* 1, *Item* (i) ]

### DETERMINATION OF 00-DIMETHYL 0-(*p*-NITROPHENYL) PHOSPHOROTHIOATE ( METHYL PARATHION ) CONTENT

**A-0.** Two methods, namely, titration method ( *see* **A-1** ) and UV visible spectroscopic method ( *see* **A-2** ) have been prescribed for the determination of methyl parathion.

### A-1. TITRATION METHOD

**A-1.1 Principle** — Methyl parathion is separated from *p*-nitrophenol, the most likely impurity, by mild alkaline extraction of an ether solution. The methyl parathion in the ether layer is reduced by zinc and an acetic acid-hydrochloric acid mixture, and the amino groups formed are titrated with the standard sodium nitrite solution.

### A-2. REAGENTS

**A-2.1 Sodium Carbonate Solution** — one percent ( *m*/*v* ).

**A-2.2 Concentrated Hydrochloric Acid**

**A-2.3 Acetic Acid** — glacial.

**A-2.4 Acetic Acid-Hydrochloric Acid Mixture** — ( 9 : 1 *v/v* ).

**A-2.5 Zinc Dust** — iron-free.

**A-2.6 Sodium or Potassium Bromide**

**A-2.7 Sulphanilic Acid** — anhydrous.

**A-2.8 Standard Sodium Nitrite Solution** — 0·1 M, prepared by dissolving 6·90 g of sodium nitrite in water and making up to one litre with water. This solution is standardized as follows.

**A-2.8.1** Weigh accurately 0·40 to 0·45 g of anhydrous sulphanilic acid into a 400-ml tall form beaker. Add 80 ml of water, 10 ml of concentrated hydrochloric acid, 30 ml of glacial acetic acid and 5 g of sodium or potassium bromide. Cool the mixture to 0 to 10°C by the addition of clean, shaved ice and place under a mechanical stirrer. Titrate this mixture at 0 to 10°C with 0·1 sodium nitrite solution as rapidly as the spot test ( *see* **A-3.3** ) permits. Near the end-point, add the sodium nitrite solution in 4-drop portions.

Calculate the normality of the 0·1 M sodium nitrite solution as:

$$\text{Normality of the 0·1 M sodium nitrite solution} = \frac{M \times 1\,000}{V \times 173{\cdot}2} = \frac{M \times 5{\cdot}774}{V}$$

where

$M$ = mass, in g, of the sulphanilic acid used; and

$V$ = volume in ml of 0·1 M sodium nitrite solution required.

## A-3. PROCEDURE

**A-3.1 Separation of Methyl Parathion from *p*-Nitrophenol** — Weigh accurately from a weighing pipette 0·6 to 0·9 g of the material into 100-ml of ether contained in a 250-ml separating funnel. Extract the ether solution four times (or until the extract is colourless) with 20-ml portions of chilled sodium carbonate solution, discarding the aqueous layers.

**A-3.2 Determination of Methyl Parathion in Ether Layer** — Transfer the ether layer quantitatively to a 400-ml beaker, using small portions of ether. Add 35 ml of the acetic acid-hydrochloric acid mixture and three grams of zinc dust. Cover the beaker with a watch-glass and heat gently on a steam-bath until most of the ether has evaporated and the solution is colourless. Add 25-ml of concentrated hydrochloric acid to complete the solution of the zinc dust. Cool, wash down the beaker and watch-glass with 100-ml of water, and add 5 g of sodium or potassium bromide. Cool the mixture to 0 to 10°C by the addition of clean, shaved ice (about 100 g) and place under mechanical stirring. Titrate the mixture at 0 to 10°C with the standard 0·1 M sodium nitrite solution as rapidly as the spot test ( *see* **A-3.3** ) permits; about 20 to 30 ml will be required. Near the end-point, add the sodium nitrite solution in 4-drop portions.

**A-3.3 Spot Test** — Dip a glass rod into the solution to be tested and then touch the rod quickly to a piece of starch potassium iodide paper. The end point is reached when an intense blue black colour appears immediately and may be obtained repeatedly during a one-minute period without further addition of the sodium nitrite solution.

## A-4. CALCULATION

**A-4.1** 00-Dimethyl 0-(*p*-nitrophenyl) phosphorothioate methyl parathion content, percent by mass $= \frac{VN \times 26\text{·}32 \times f}{M}$

where

$V$ = volume, in ml, of the 0·1 M standard sodium nitrite solution required ( *see* **A-3.2** );

$N$ = normality of the 0·1 M sodium nitrate solution ( *see* **A-2.8.1** );

$f$ = correction factor ( *see* **A-4.1.1** ); and

$M$ = mass, in g, of the material taken for the test ( *see* **A-3.1** ).

**A-4.1.1** *Correction Factor* — Determine the value of the correction factor $f$ ( *see* Note 1 ) from the formula:

$$f = \frac{T}{A}$$

where

$T$ = theoretical, calculated quantity of the 0·1 M sodium nitrite solution to be used in the nitro group determination of one gram of a pure and solid substance containing one nitro group ( *see* Note 2 ); and

$A$ = actual quantity of 0·1 M sodium nitrite solution used in the nitro group determination of one gram of pure, recrystallized sample of the same substance, following the method described above and using the same reagents.

NOTE 1 — The correction factor $f$ includes the errors arising from the impurities of the reagents, the method itself and the handling of the method in a given laboratory. Its value shall lie within the range of 0·98 to 1·02.

NOTE 2 — Since methyl parathion is usually not available as a pure material, $f$ is evaluated on the basis of another substance containing one nitro group. The suitable chemicals are:

| *Chemical* | *Melting Range* |
|---|---|
| *o*-nitrobenzoic acid | 146-148°C |
| *m*-nitrobenzoic acid | 140-142°C |
| *p*-nitrobenzoic acid | 240-242·5°C |
| 3-nitrosalicylic acid, monohydrate | 124-126°C |
| 3-nitrosalicylic acid, anhydrous | 144-146°C |
| 5-nitrosalicylic acid | 228-230°C |
| *p*-chloronitrobenzene | 83-84°C |
| *p*-bromonitrobenzene | 126-127°C |

## A-5. UV VISIBLE SPECTROSCOPIC METHOD

**A-5.1 Principle** — Sodium *p*-nitrophenolate is obtained by the alkaline hydrolysis of methyl parathion. The liberated sodium *p*-nitrophenolate is determined colorimetrically, at 400 nm by UV visible spectroscopy and is then converted to methyl parathion by calculation. Similarly free *p*-nitrophenol is determined and the corrected methyl parathion content is obtained by calculation.

### A-5.2 Apparatus

**A-5.2.1** *Volumetric Flasks* — 100-ml, 250-ml, 500-ml and 1 000-ml capacity.

**A-5.2.2** *Pipettes* — 20-ml, 25-ml and 50-ml capacity.

**A-5.2.3** *Beakers*

**A-5.2.4** *Conical Flask* — 250-ml capacity with standard joints.

**A-5.2.5** *Separating Funnel* — 250-ml capacity.

**A-5.2.6** *UV Visible Spectrophotometer*

### A-5.3 Reagents

**A-5.3.1** *Methanol*

**A-5.3.2** *Diethyl Ether*

**A-5.3.3** *Sodium Hydroxide Solution* — 1 N.

**A-5.3.4** *Sodium Hydroxide Solution* — 0·1 N.

**A-5.3.5** *Sodium Carbonate Solution* — 1 percent ( *m/m* ), chilled.

**A-5.3.6** *Methyl Parathion* — of known purity.

### A-5.4 Procedure

**A-5.4.1** *Preparation of Standard Methyl Parathion Solution*

**A-5.4.1.1** Weigh accurately about 0·8 g of pure methyl parathion in 250-ml conical flask. To it add 50-ml methanol and 25-ml 1 N standard sodium hydroxide solution. Heat the mixture under reflux condenser for 1 hour. Cool for 15 minutes and wash the condenser with 100-ml of 0·1 N standard sodium hydroxide solution, followed by 25-ml of distilled water : cool to room temperature and transfer the contents quantitatively to 1 000-ml volumetric flask with distilled water. Shake well to mix the contents. Call this as *solution A*.

**A-5.4.1.2** Transfer 25-ml of *solution A* into a 250-ml volumetric flask and make up the volume with distilled water. Shake well to get a uniform solution. Call this as *solution B*.

**A-5.4.1.3** Transfer 20-ml of *solution B* into a 100-ml volumetric flask and make up the volume with distilled water, shake well to get a uniform solution. Call this as *solution C.*

**A-5.4.1.4** Measure the absorbance of *solution C* at 400 nm against distilled water as blank.

**A-5.4.2** *Preparation of Methyl Parathion Technical Solution*

**A-5.4.2.1** Weigh accurately about 0·8 g for methyl parathion technical and 1·0 g for 80 percent methyl parathion technical concentrate in 250-ml conical flask and proceed exactly as described in **A-5.4.1**.

**A-5.4.3** *Determination of Free p-Nitrophenol*

**A-5.4.3.1** Weigh accurately about 0·08 g of methyl parathion technical or 0·1 g of 80 percent methyl parathion technical concentrate in a 50-ml beaker. Transfer it to a 250-ml separating funnel containing 50-ml solvent ether quantitatively with about 50-ml solvent ether. Extract the free *p*-nitrophenol with 20-ml of 1 percent chilled sodium carbonate solution. Continue the extraction till the aqueous sodium carbonate phase is colourless. Depending on the volume of carbonate washings transfer it to 100-ml, 250-ml or 500-ml volumetric flask quantitatively and make up the volume with distilled water. Prepare a 1 percent sodium carbonate solution blank by diluting the equivalent volume of 1 percent sodium carbonate solution required for the extraction of *p*-nitrophenol to the same volume as it is done for *p*-nitrophenol extract. Shake well to get uniform solutions. Measure the absor-bance of *p*-nitrophenol extract in sample cell and sodium carbonate blank solution in reference cell.

**A-5.4.4** *Calculation*

$$\text{Methyl parathion, percent by mass} = \left[\frac{A_2 \times M_1 \times P}{A_1 \times M_2}\right] - \left[\frac{A_3 \times M_1 \times P}{A_1 \times M_3 \times F}\right]$$

where

$A_2$ = absorbance of standard;

$M_1$ = mass, in g, of the standard;

$P$ = percentage purity of standard methyl parathion;

$A_3$ = absorbance of *p*-nitrophenol extract;

$A_1$ = absorbance of standard;

$M_2$ = mass, in g, of the sample;

$M_3$ = mass, in g, of sample taken for *p*-nitrophenol extraction; and

$F$ = dilution factor which will be

500 if $p$-nitrophenol extract is diluted to 100-ml
200 if $p$-nitrophenol extract is diluted to 250-ml
100 if $p$-nitrophenol extract is diluted to 500-ml

Printed at New India Printing Press, Khurja, India

# AMENDMENT NO. 2 SEPTEMBER 1989
# TO
# IS : 2570 - 1930 SPECIFICATION FOR METHYL PARATHION, TECHNICAL

## *( First Revision )*

***( Amendment No. 1, May 1988, page 2. clause A-3.2, third sentence )*** — Substitute the following for the existing sentence:

> ‘Cover the beaker with a watch-glass and heat gently on *a* steam bath for 30 minutes, when most of the ether would be evaporated and the solution turned colourless.’

( ***Amendment No. 1, May 1988, page 5, clause A-5.4.4*** ) — Substitute ‘$A_2$ = absorbance of sample’ *for* ‘$A_2$ = absorbance of standard’.

**( AFCDC 6 )**

**Printed at New India Printing Press, Khurja, India**